



NEOCARE

RPPG BASED NEONATAL HEALTH MONITORING SYSTEM

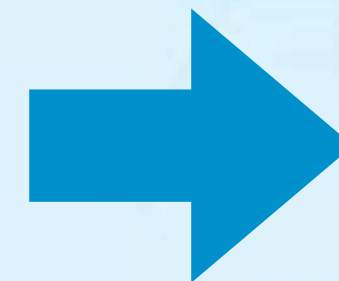
Members

Lasitha Amarasinghe
Sahan Abeyrathna
Induwara Morawakgoda
Yasiru Alahakoon



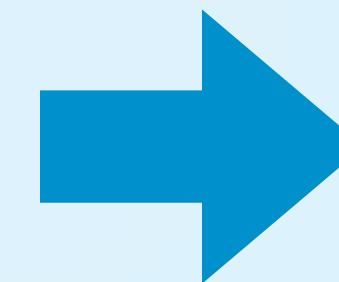
Previous Team

Neonatal Heart Rate Estimation
on NBHR Dataset



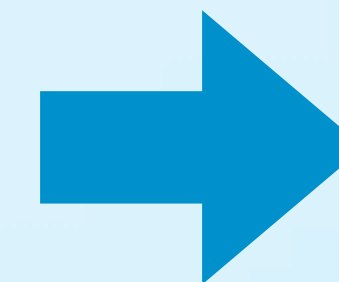
lowest MAE
lowest MAPE

Neonatal SpO2 Level Estimation
on NBHR Dataset



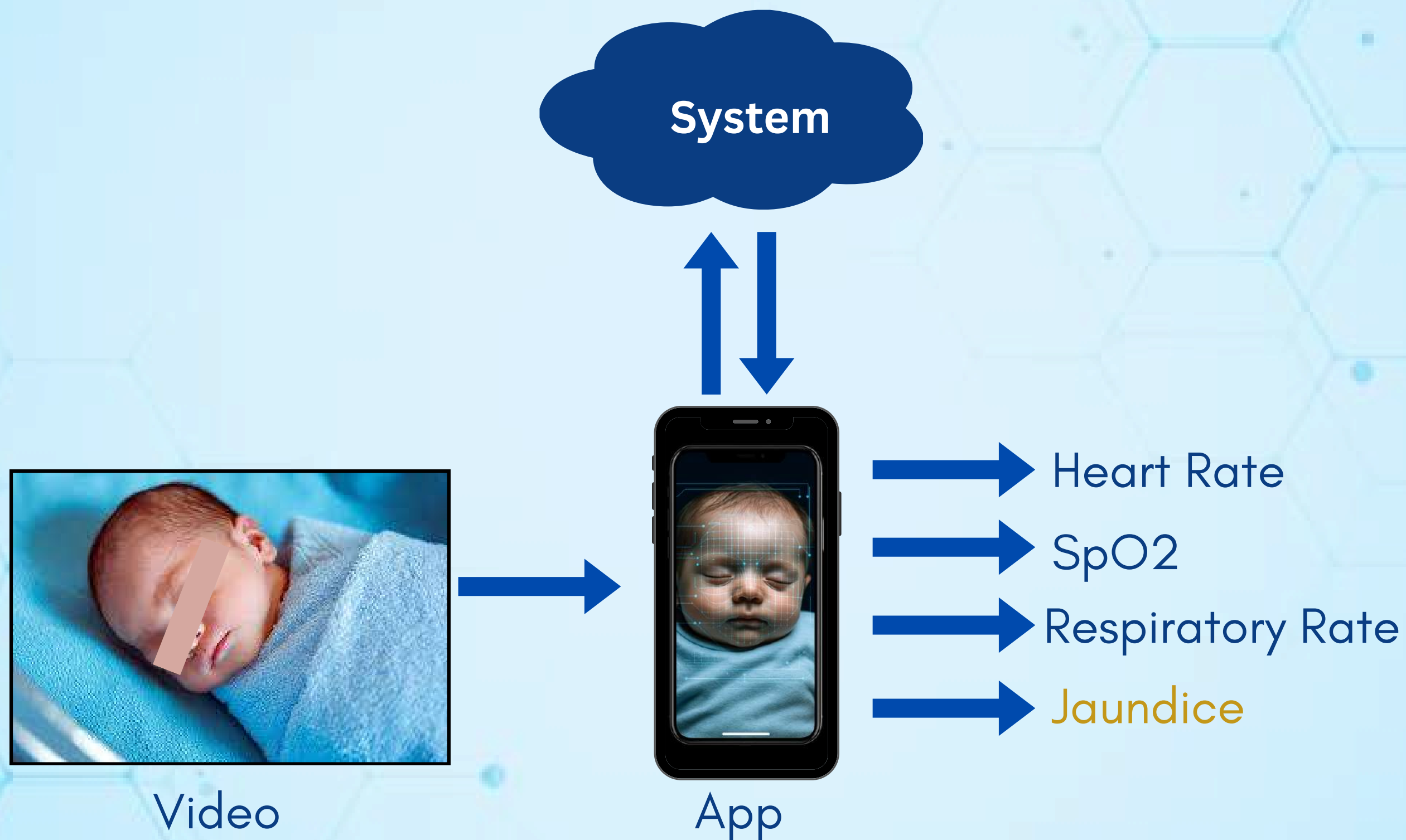
lowest MAE
lowest RMSE

Neonatal Facial Video Dataset



VideoPulse

PROPOSED APPROACH

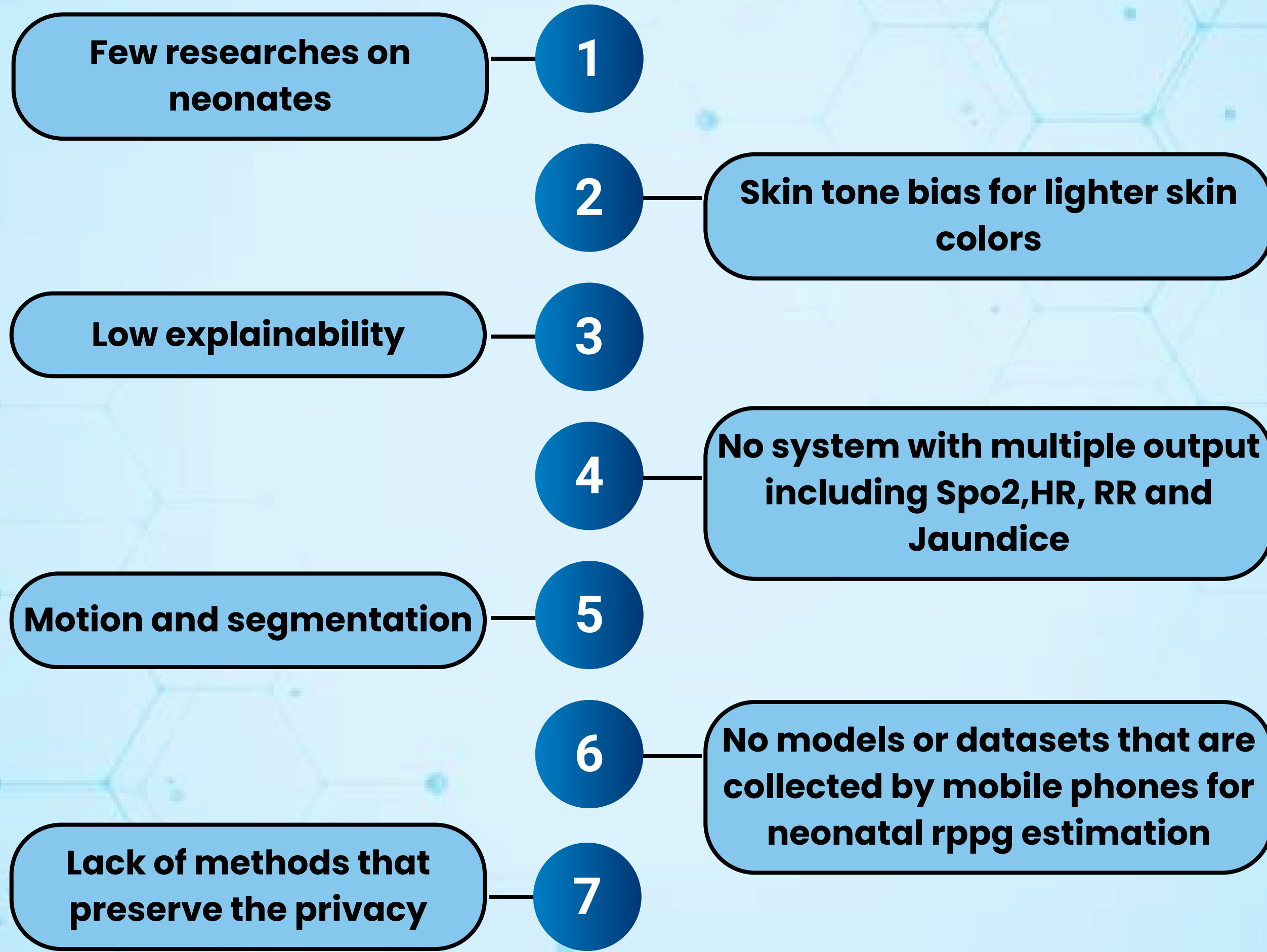


JAUNDICE



- Excess bilirubin in the blood
- Newborns and premature babies
- Yellowing of skin and eyes
- Brain damage (kernicterus) if untreated

RESEARCH GAPS



DELIVERABLES

Enhance existing non-contact, video-based algorithms to accurately estimate HR, SpO₂, RR, jaundice status in neonates

Create a new dataset specifically for neonates to validate these algorithms

Mobile application for contactless monitoring of neonates

NOVELTY

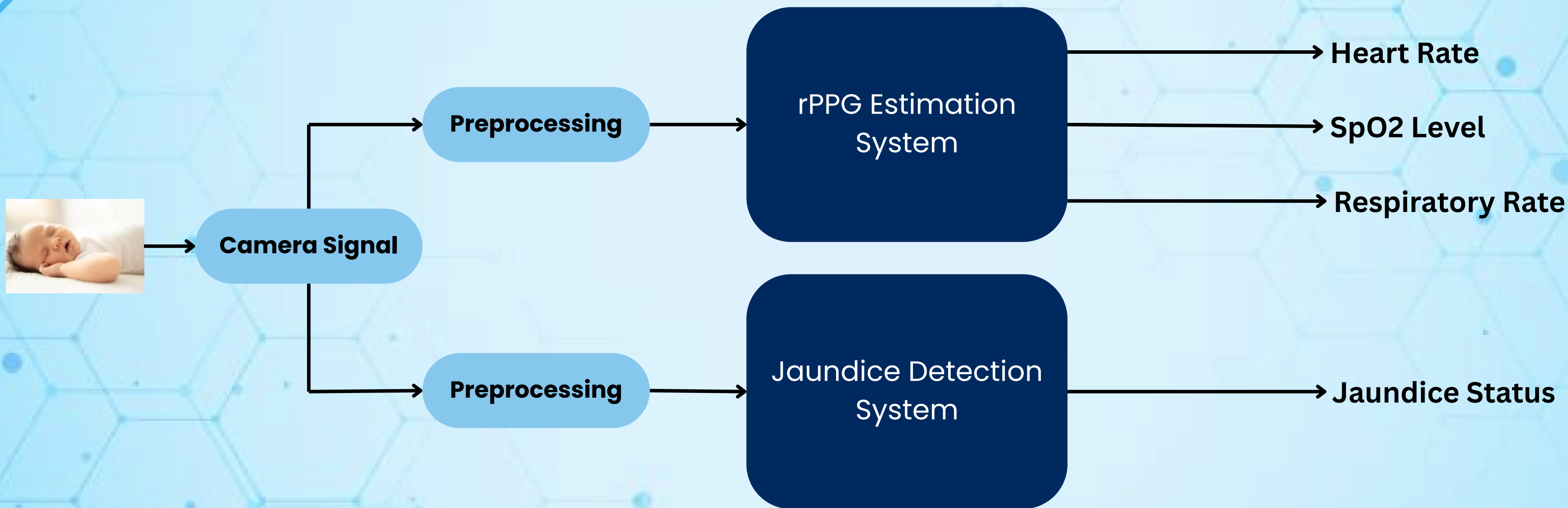


First method on neonatal respiratory rate prediction using non invasive methods

First mobile app to embed several vital signs including RR, HR, SpO2 level for neonates

Creating a new dataset on neonates that supports HR, SpO2 and RR

Algorithm Development



Data Collection Process



rPPG



Video signal



PPG signal , HR &
SpO2 Level



RR through Manual
Counting

Data Collection
Application

SSD Storage

Jaundice Status



Image



Jaundice Status
through Blood
Samples

Data Collection
Application

SSD Storage

CURRENT PROGRESS

Ethical Clearance



All documents submitted and waiting for the approvals

Hospital Investigation



At De Soysa Hospital for Women



Discussed with Dr. Nishani Lucas about the data collection and the practical procedures of detecting jaundice and other vital signs.

Dataset Investigation



rPPG

- NBHR
- VideoPulse ✓

Jaundice

- NJN ✓
- NJA ✓

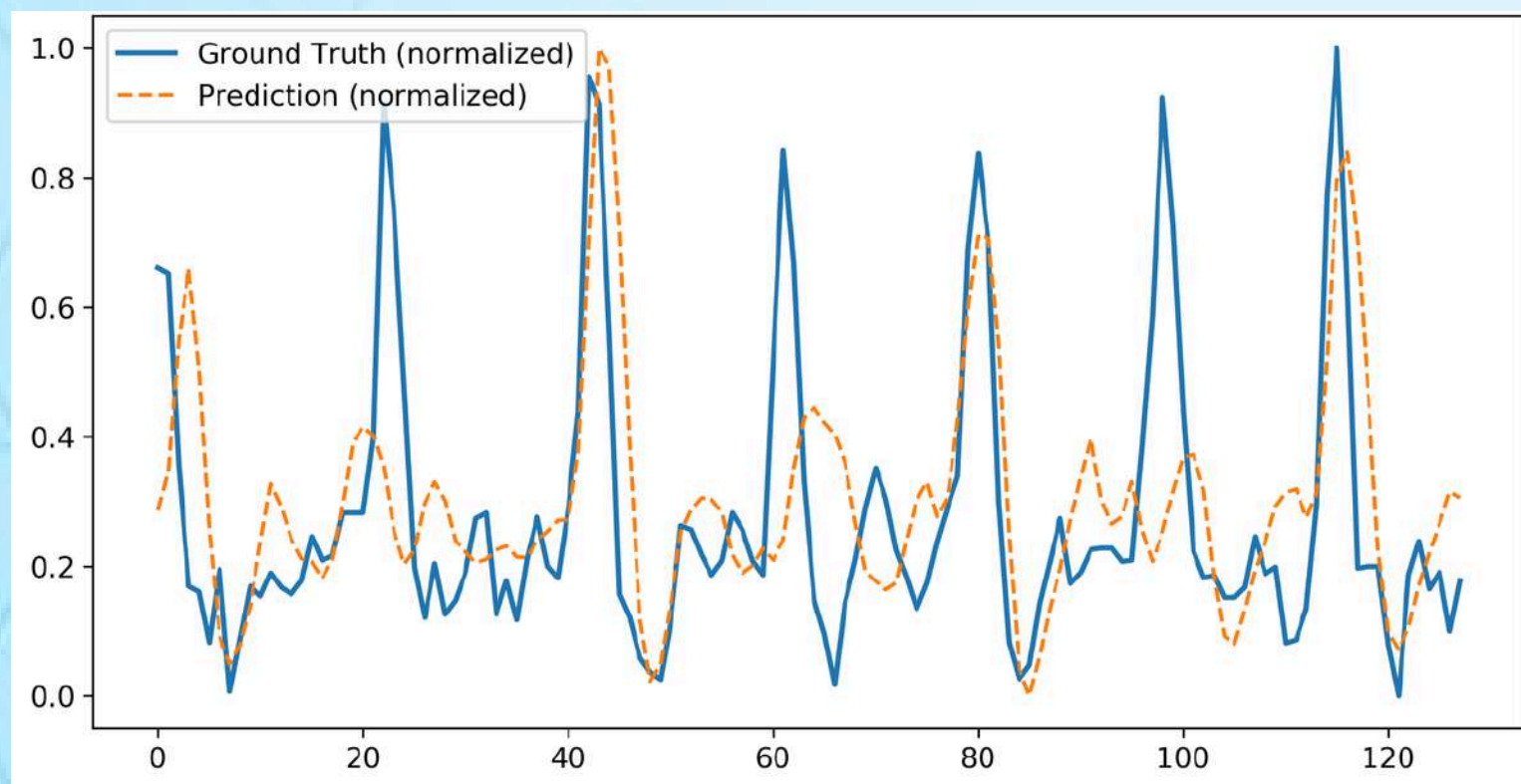
Huang, Bin & Chen, Weihai & Lin, Chun-Liang & Juang, Chia-Feng & Xing, Yuanping & Wang, Yanting & Wang, Jianhua. (2021). A neonatal dataset and benchmark for non-contact neonatal heart rate monitoring based on spatio-temporal neural networks. Engineering Applications of Artificial Intelligence. 106. 104447. [10.1016/j.engappai.2021.104447](https://doi.org/10.1016/j.engappai.2021.104447).

Abdulrazzak, A. Y., Mohammed, S. L., & Al-Naji, A. (2023). NJN: A Dataset for the Normal and Jaundiced Newborns. BioMedInformatics, 3(3), 543–552. <https://doi.org/10.3390/biomedinformatics3030037>

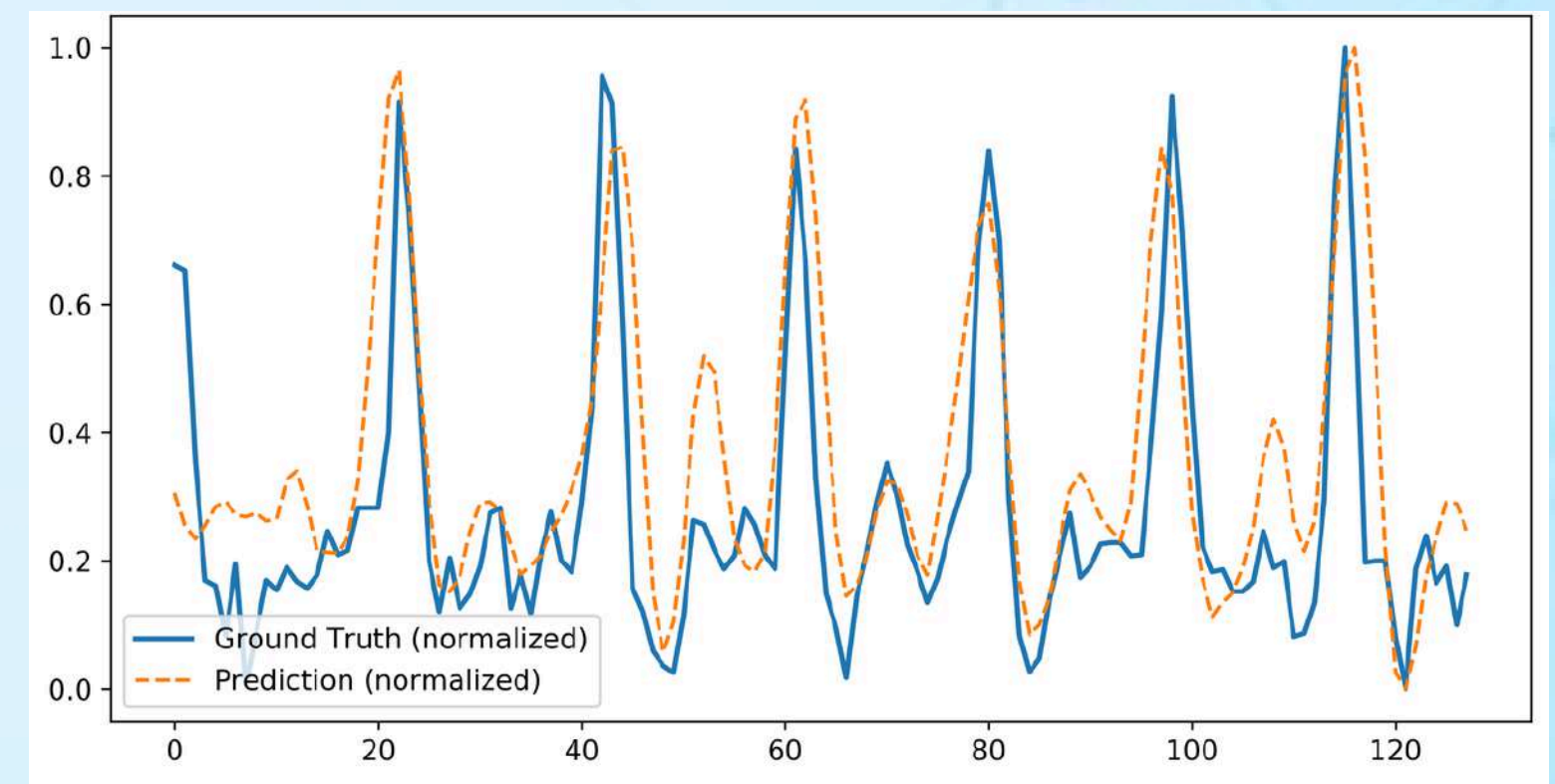
Makhloughi, F., Sadeghi Bajestani, G., & Faramarzi, R. (2024). Neonatal Jaundice Assessment: A Dataset of Forehead and Sternum Images for Bilirubin Estimation (Version1) [Dataset]. Mendeley Data. <https://doi.org/10.17632/yfsz6c36vc.1>

rPPG Toolbox

- Evaluated PhysMamba and PhysNet using the rPPG toolbox.
- We used UBFC-rPPG dataset (adults) and NBHR/VideoPulse datasets (neonates)
- PhysMamba outperformed PhysNet in signal reconstruction



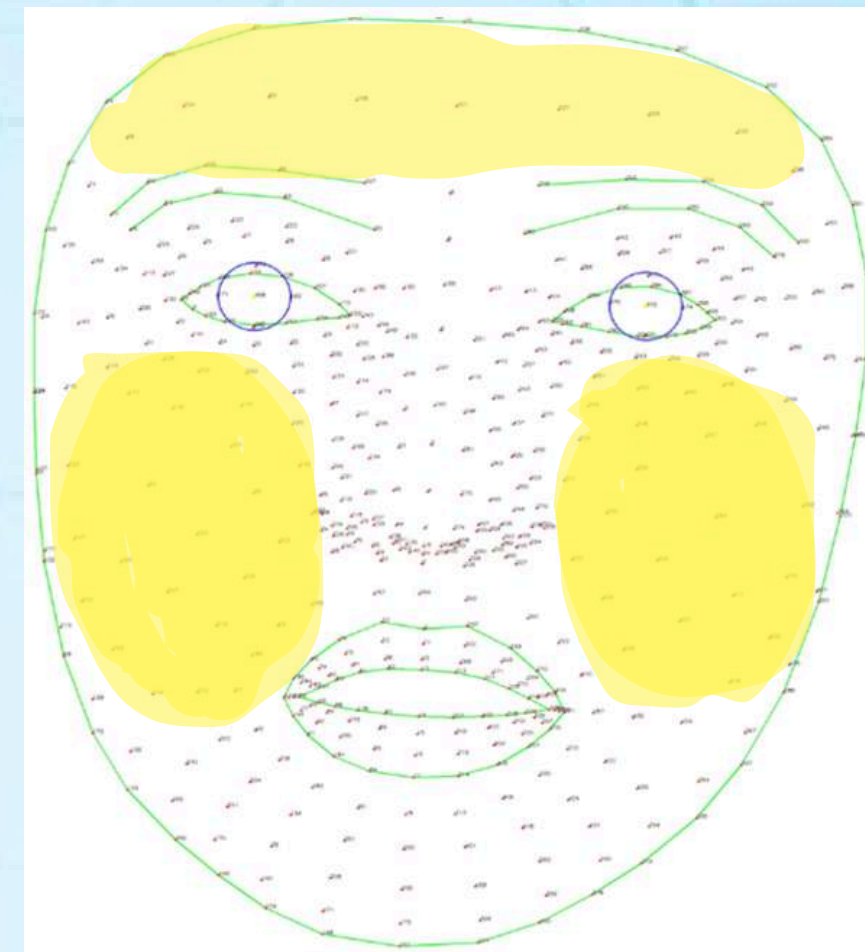
rPPG signal from Physnet Model



rPPG signal from PhysMamba Model

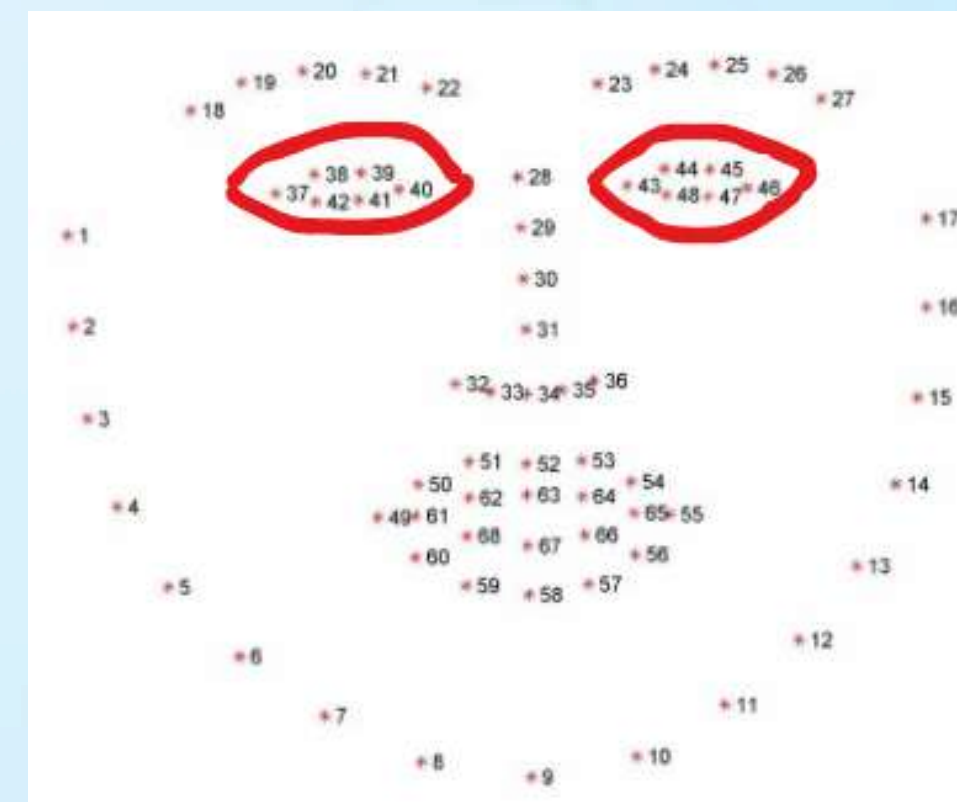
ROI Selection

- Detect forehead and cheeks
- Mediapipe 468-point facemesh
- landmarks 234-243 => left cheek
landmarks 454-463 => right cheek
landmark 1-5, 152-159 => forehead



Privacy Preserving

- Dlib's 68-point model - detect eye coordinates and blur them
- landmarks 36-41 => left eye
landmarks 42-47 => right eye



Jaundice Detection

MobileNet v5

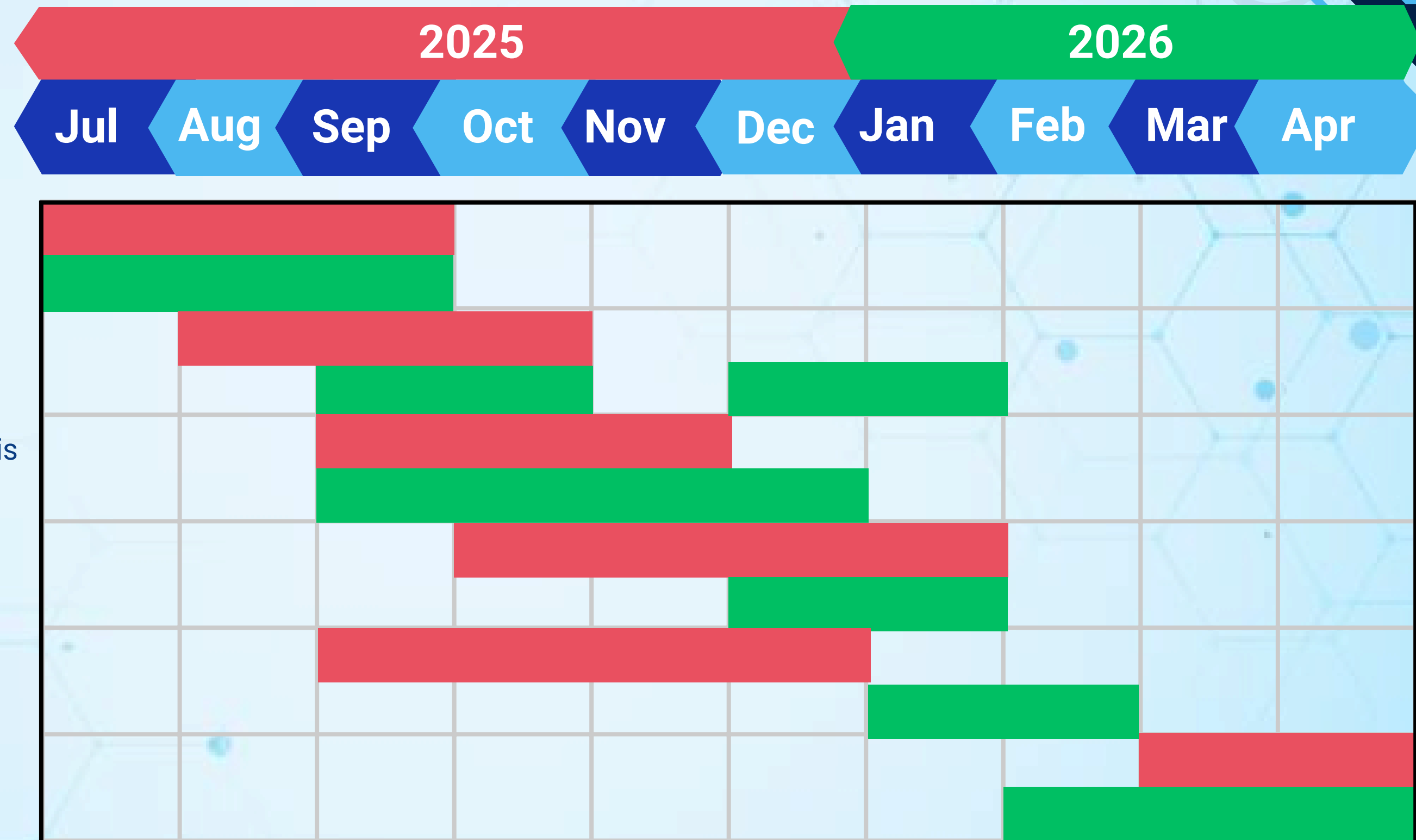
- Lightweight & efficient → optimized for mobile/edge devices, ideal for smartphone-based medical apps.
- Tested with MobileNetV5 backbone as the classifier for jaundice detection.
- Need to Fine-tune to adapt to jaundice vs. non-jaundice classification
- Tested inference on sample facial images to evaluate detection capability.

Time Line



Tasks

- Literature Review
- Ethical and Legal Clearance
- Hospital Environment investigation
- Data Acquisition
- Dataset Creation, Filtering & Analysis
- Explore Algorithm Enhancement
- Design Model Architecture
- Training and Validation
- Mobile App Development
- Mobile App Deployment
- Final Testing
- Publication Work





THANK YOU